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(71)出願人　000002071
チッソ株式会社
大阪府大阪市北区中之島３丁目６番32号

(72)発明者　石澤　整
滋賀県守山市立入町251番地

(72)発明者　鈴木　正康
滋賀県野洲郡野洲町大字小篠原字廉田1831番１

(72)発明者　寺田　博和
滋賀県守山市勝部町380－16

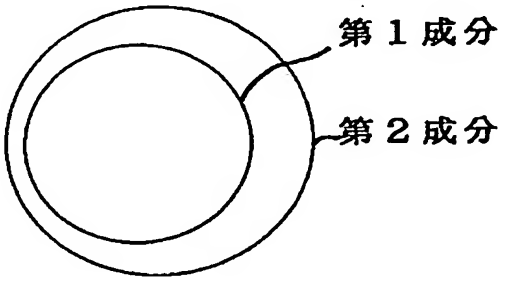
(74)代理人　弁理士　野中　克彦

(54)【発明の名称】　熱融着性複合繊維および熱融着不織布

(57)【要約】

【目的】　不織布強力、高嵩高回復性、ネップ（小さい繊維塊）の少ない地合特性に優れ、風合のソフトな、生理用ナプキン、紙おむつ等の衛生材料表面材、および衛生材料表面材として広く用いられる熱融着不織布および熱融着性複合繊維の製造方法を提供することを目的とする。

【構成】　結晶性ポリプロピレンから成る第１成分と主としてポリエチレンから成る第２成分とからなり、第２成分が繊維表面の少なくとも一部を長さ方向に連続して存在するように並列型または偏芯鞘芯型に配し、４～１６山／吋の３次元の顕在捲縮を有し、単糸繊度１．０～２．０ｄ、見かけカット長が２０～４０ｍｍの熱融着性複合繊維。



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【特許請求の範囲】

【請求項１】　結晶性ポリプロピレンから成る第１成分と主としてポリエチレンから成る第２成分とからなり、第２成分が繊維表面の少なくとも一部を長さ方向に連続して存在するように並列型または偏芯鞘芯型に配し、４～１６山／吋の３次元の顕在捲縮を有し、単糸繊度１．０～２．０ｄ、見かけカット長が２０～４０ｍｍの熱融着性複合繊維。

【請求項２】　並列型または偏芯鞘芯型口金で紡糸する紡糸工程、紡糸された未延伸糸を９０℃以上１３０℃以下の温度で最高延伸比の０．６０～０．８５倍で延伸する延伸工程、延伸糸を予熱温度以下に冷却し捲縮加工する捲縮加工工程、冷却後８０℃以上１２０℃以下の温度でアニーリングするアニール工程を経由した請求項１の熱融着性複合繊維の製造方法。

【請求項３】　請求１項の熱融着性複合繊維または請求項２の製造方法で得られた熱融着性複合繊維を５０重量％以上含有し、且つ該複合繊維の第２成分の熱融着により繊維の交点が熱融着された熱融着不織布。

【請求項４】　請求項３の熱融着不織布を用い、厚さ１ｍｍ以上の衛生材料表面材。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】　本発明は熱融着性複合繊維の製造方法および熱融着不織布に関するものである。更に詳しくは、不織布強力、高嵩高回復性、ネップ（小さい繊維塊）の少ない地合特性に優れ、風合のソフトな、生理用ナプキン、紙おむつ等の衛生材料表面材、衛生材料表面材として広く用いられる熱融着不織布および熱融着性複合繊維の製造方法に関する。

【０００２】

【従来の技術と問題点】　近年生理用ナプキン、紙おむつ等の衛生材料表面材などの不織布は、多様化に伴い要求される性能も高度化し、出来るだけ少ない目付で不織布強力を維持し、且つ嵩高回復率が高く、地合特性としてのネップ（小さい繊維塊）が少なく、風合がソフトなものが要求されている。これらを満たすために、第１成分のＱ値、特定温度での予熱、延伸倍率、捲縮数、捲縮弾性率などを特定した熱融着性複合繊維を熱融着した嵩高性不織布の製造方法が、特公平１－３７５０５により知られている。

【０００３】　しかし衛生材料表面材としては、まだ不十分であり、開繊（カード）工程でトラブルがあり、ネップ（小さい繊維塊）が多く地合を悪化し、嵩高回復率が小さく、強力がなく、かつ風合の悪い不織布であった。またこれらを全て解決する不織布の開発が望まれている。

【０００４】

【問題を解決するための手段】　本発明者は上記欠点を改良すべく鋭意研究を重ねた結果以下に示す発明に到達

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した。すなわち、本発明は、結晶性ポリプロピレンから成る第１成分と主としてポリエチレンから成る第２成分とからなり、第２成分が繊維表面の少なくとも一部を長さ方向に連続して存在するように並列型または偏芯鞘芯型に配し、４～１６山／吋の３次元の顕在捲縮を有し、単糸繊度１．０～２．０ｄ、見かけカット長が２０～４０ｍｍの熱融着性複合繊維であり、並列型または偏芯鞘芯型口金で紡糸する紡糸工程、紡糸された未延伸糸を９０℃以上１３０℃以下の温度で最高延伸比の０．６０～０．８５倍で延伸する延伸工程、延伸糸を予熱温度以下に冷却し捲縮加工する捲縮加工工程、冷却後８０℃以上１２０℃以下の温度でアニーリングするアニール工程を経由した上記の熱融着性複合繊維の製造方法であり、上記の熱融着性複合繊維または製造方法で得られた熱融着性複合繊維を５０重量％以上含有し、且つ該複合繊維の第２成分の熱融着により繊維の交点が熱融着された熱融着不織布であり、上記の熱融着不織布を用い、厚さ１ｍｍ以上の衛生材料表面材である。

【０００５】　本発明の熱融着性複合繊維において第１成分として用いる結晶性ポリプロピレンとはプロピレンを主成分とする結晶性重合体の総称であり、この中にはプロピレンの単独重合体のみならずエチレン、ブテン－１あるいは４－メチルペンテン－１等との共重合体等が含まれる。また、第２成分として主として用いるポリエチレンとは高圧法ポリエチレンあるいは中低圧法ポリエチレンの如きエチレンを主成分とする重合体の総称であり、この中にはエチレンの単独重合体のみならず、プロピレン、ブテン－１あるいは酢酸ビニルとの共重合体（ＥＶＡ）等が含まれるが、このポリエチレンの融点は第１成分である結晶性ポリプロピレンの融点より２０℃以上低いことが好ましい。上記結晶性ポリプロピレンおよびポリエチレンには、本発明の目的を損はない範囲において、ポリオレフィン繊維に通常用いられる各種の安定剤、充填剤、顔料等を添加することができる。

【０００６】　本発明の熱融着性複合繊維は、複合繊維並列型または偏芯鞘芯型口金から紡糸された複合繊維であり、複合繊維第２成分が繊維表面の少くとも一部を長さ方向に連続して存在する必要があり、繊維表面を出来るだけ広く被うことが好ましい。また、該熱融着性複合繊維は２成分の弾性収縮の差を利用して捲縮を発生させる為、鞘芯構造の際は芯成分が図－１に示すような偏った偏芯鞘芯型構造が好ましく、芯成分の中心は、複合成分外径の中心から５～１５％偏った方が好ましい。このような複合繊維は並列型あるいは第２成分を鞘成分とする鞘芯型の従来公知の溶融紡糸法によって得ることが出来る。両成分の複合の割合には特別な限定はないが、第２成分が４０～７０重量％であることが好ましい。

【０００７】　本発明の熱融着性複合繊維は、３次元捲縮を有し、後記する不織布化熱処理時に捲縮の生じない、いわゆる潜在捲縮を実質的に有しない繊維が望まし

い。潜在捲縮を実質的に有しない繊維であると、不織布化熱処理時に発生する潜在捲縮の発現に伴う収縮を回避することができる。本発明の熱融着性複合繊維の捲縮数は、４～１６山／吋、好ましくは６～１４山／吋である。捲縮数が４山／吋未満の場合、カード機のシリンダーに巻き付く等の原因となり、１６山／吋を越えると開繊が悪くなり、不織布化の際ネップの発生等起こるのでこの様なの物は対象としない。

【０００８】　本発明の熱融着性複合繊維は単糸繊度１．０～２．０ｄであることが必要であり、１．０ｄ未満のとき、捲縮数が細かくなりネップ発生等の問題があり、又２．０ｄを越える場合、風合が堅くなったり、不織布の回復率が劣る傾向が見られているのでこの様な物は対象としない。

【０００９】　本発明の熱融着性複合繊維の見かけカット長は２０～４０ｍｍ、好ましくは２５～３５ｍｍである。２０ｍｍ未満の時、カード機内での繊維の移行性が悪く、ウォーカーに巻き付く等のトラブルの原因となり、又４０ｍｍを越えると繊維の絡みが強くなりネップ発生等の原因となる。また本発明の熱融着性複合繊維は、見かけカット長／カット長の比が５０～７０％のものが好ましい。５０％未満の時、カード機内での繊維の移行性が悪く、シリンダー等に巻き付きネップ発生等のトラブルの原因となり、７０％を越えると繊維の絡みが強くなり、ティーカインでの巻き付き等の原因となり、カード工程自体が不能となる。

【００１０】　本発明の熱融着性複合繊維の製造方法は、並列型または偏芯鞘芯型口金で紡糸する紡糸工程、紡糸された未延伸糸を９０℃以上１３０℃以下の温度で最高延伸比の０．６０～０．８５倍で延伸する延伸工程、延伸糸を予熱温度以下に冷却し捲縮加工する捲縮加工工程、冷却後８０℃以上１２０℃以下の温度でアニーリングするアニール工程を経由する。

【００１１】　紡糸工程は、結晶性ポリプロピレンから成る第１成分と主としてポリエチレンから成る第２成分を紡糸し、第２成分が繊維表面の少なくとも一部を長さ方向に連続して存在するように並列型または偏芯鞘芯型口金で紡糸する。延伸温度工程では、紡糸された未延伸糸を延伸温度に予熱する。延伸温度が９０℃未満の場合、捲縮数が細かくなり、又、１３０℃を越える場合、ポリエチレンによる繊維同士の融着が著しく発生するので好ましくない。延伸比が最高延伸比の０．６０倍以下の場合、捲縮を発生させるための２成分の弾性収縮の差が少なくなり、捲縮が発生しなく、又０．８５倍以上になると、弾性収縮の差が大きく、捲縮の周期が小さくなり捲縮数が多くなるばかりか見かけカット長が小さくなるため好ましくない。ここで、最高延伸比とは延伸比を徐々に上げていつた際にトウに毛羽が発生し始めるときの延伸比を言う。

【００１２】　捲縮加工工程は、延伸糸を延伸温度以下

に冷却し、ニップロールの引き取りロール等により延伸糸を緊張状態で引き取り弛緩状態にすることにより捲縮を発現させる。この際、延伸温度を越える温度の場合、捲縮が不十分となる。アニール工程では、捲縮加工後、捲縮の発現した熱融着性複合繊維を８０℃以上１２０℃以下の温度で約０．５～３０分間アニーリングする。アニーリング温度が８０℃未満では不織布加工時潜在捲縮が発生する恐れがあるため、また１２０℃以上では弾性収縮の差で発生した捲縮が伸び見かけカット長が大きくなるのでいずれも好ましくない。本発明の熱融着性複合繊維は不織布への加工のし易さ等から所定の長さに切断しステープルとして用いられることが多い。

【００１３】　本発明の熱融着不織布は、上記の熱融着性複合繊維を５０重量%以上含有し１００重量%であってもよい。熱融着不織布は、従来のカーディング法、エアーレイ法、乾式パルプ法によりウェブとし、該ウェブを加熱し熱融着することにより不織布として得られる。本発明の熱融着不織布は、上記の熱融着性複合繊維以外の繊維として、ポリエステル、ポリアミド、ポリプロピレン、ポリエチレン、その他の合成繊維あるいは木綿や羊毛などの天然繊維、レーヨン等の繊維が５０重量%未満混合されてもよい。この際、該熱融着性複合繊維は５０重量%以上混合されていることが必要である。該熱融着性複合繊維が５０%未満のとき、繊維の交点における熱融着点が少ないので高い不織布強力が得られないばかりか、目的の嵩高性、回復性が得られないのでこの様な物は対象としない。

【００１４】　加熱し熱融着する方法としては、熱風ドライヤー、サクションバンドドライヤー等の方法が挙げられ、これにより複合繊維の第２成分の熱融着により繊維の交点が熱融着され、不織布となる。該熱処理温度は、複合繊維の第２成分の融点以上、第１成分の融点以下の温度であり約１２０－１５５℃である。処理時間は、ドライヤー等を用いる場合約５秒以上である。本発明の衛生材料表面材は、上記熱融着不織布を用い、厚さ１ｍｍ以上の衛生材料表面材である。特に嵩高特性が１ｍｍ以上、回復率が５０%以上であること望ましい。厚さが１ｍｍ未満、かつ回復率が５０%未満の際、ソフトな風合いが得られないのでこの様な物は対象としない。ここで言う厚さとは、１ｃｍ²あたり５０ｇｆの荷重を２４時間かけ、その後１時間無荷重で放置、厚さを回復させ、１ｃｍ²あたり２ｇｆの荷重をかけて測定した厚さ（ｍｍ）を差し、回復率とは１ｃｍ²あたり５０ｋｇｆの荷重を２４時間かけ測定した厚さとその後１時間無荷重で放置、厚さを回復させ測定した厚さの差を百分率（%）で示した物である。

【００１５】

【実施例】以下、実施例を挙げて本発明を具体的に説明する。なお実施例中に示された物性値の測定法又は定義をまとめて示しておく。

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捲縮数：ＪＩＳ　Ｌ１０１５（化学繊維ステープル試験方法）７．１２．１に準じて測定した。

単糸繊度：ＪＩＳ　Ｌ１０１５（化学繊維ステープル試験方法）７．５．１のＡ法に準じて測定した。

【００１６】見かけカット長：捲縮を施したステープルを伸ばしたり、余計な力を加えずに無緊張化での繊維長（ｍｍ）を測定、３０測定値の平均を求めた。

嵩特性：得られた不織布に１ｃｍ²あたり５０ｇｆの荷重を２４時間かけ厚さ（Ａ）測定し、その後１時間無荷重で放置、厚さを回復させ、１ｃｍ²あたり２ｇｆの荷重をかけ厚さ（Ｂ）を測定し、回復率（厚さ（Ｂ）－厚さ（Ａ））／厚さ（Ｂ）の百分率（％）で求め、合否判定は５０％以上を合とし、それ以外を否とし、合を○、否を×で示した。

不織布強力：ＪＩＳ　Ｌ１０８５（不織布芯地試験方法）に準じ巾５ｃｍの試験片を、つかみ間隔１０ｃｍ，引張速度３０±２ｃｍで繊維方向（ＭＤ）とその直角方向（ＣＤ）で測定し、合否判定はＭＤ強力２５００ｇ／５ｃｍ以上を合、未満を否、ＣＤ強力５００ｇ／５ｃｍ以上を合、未満を否とし、合を○、否を×で示した。

ネップ数：不織布１ｍ²内にあるネップの数を数え、個／ｍ²で示し、１以下を合とし、２以上を否とし、合を○、否を×で示した。

風合：５人のパネラーによる官能試験を行い、全員がソフトであると判定した場合を優、３名以上がソフトであると判定した場合を良、３名以上がソフト感に欠けると判定した場合を不可と評価し、優を○、良を△、不可を×、で示した。

Ｗｅｂ収縮：ウエブを２５ｃｍ四方に切り、ドライヤー＊

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＊を用い無荷重下１４５℃で５分間加熱した後、繊維方向の収縮を３箇所求め、平均値を示し、１０％未満を合、１０％以上を否とし、合を○、否を×で示した。

【００１７】　実施例１～４，比較例１～９

ポリプロピレンを第１成分とし、第１表に示すポリエチレンを第２成分とし、孔径０．６ｍｍ、孔数３５０の芯鞘型、及び並列型口金を用いて複合繊維を紡糸、第１表に示す条件で延伸、所定の長さのカッターを用いて第１表に示すステープルを得た。これらの繊維物性をまとめて第１表に示した。

【００１８】　得られた熱融着性複合繊維ステープルをカード機により目付け２０～３０ｇ／ｍ²のウェブとし、このウェブをサクションバンドドライヤーを用いて１３５～１４０℃の所定温度で５秒間加熱処理し熱融着性繊維の交点が熱融着した不織布を得た。不織布特性等を第２表に示した。第２表中、実施例４、比較例８には、第１表の実施例１及び比較例３のステープルを用いた。

【００１９】

【発明の効果】　本発明の熱融着性複合繊維は、これまで不可能であった嵩高回復性が高く、地合特性が良く、高強力があり、タッチ感は非常にソフトな不織布、衛生材料表面材として有用な繊維であり、これら全ての改良を同時に満足するものが得られた。これにより生理用ナプキン、紙おむつ等の不織布、衛生材料表面材などに広く用いることができる。

【００２０】

【表１】

	繊維物性等														
	第１成分	第２成分	複合構造	複合比率 第１成分／第２成分	延伸温度 ℃	冷却温度 ℃	アニール温度 ℃	実延伸比	最高延伸比	ＭＳ比[1]	発現数 山／吋	捲縮形態	単糸繊度 d	カット長 mm	見かけカット長 mm
実施例１	ＰＰ[2]	ＰＥ[3]	鞘芯型	50／50	115	50	100	4．0	4．8	0．83	11．3	3次元	1．5	51	34
比較例１	↑	↑	↑	↑	↑	↑	130	↑	↑	↑	3．5	↑	↑	↑	43
比較例２	↑	↑	↑	↑	↑	↑	100	4．4	↑	0．92	18．2	↑	↑	↑	21
比較例３	↑	↑	↑	↑	↑	↑	↑	4．0	↑	0．83	12．7	機械[5]	↑	↑	29
比較例４	↑	↑	↑	↑	110	80	80	3．2	3．5	0．91	16．0	3次元	0．8	↑	22
比較例５	↑	↑	↑	↑	↑	↑	↑	2．0	↑	0．57	3．1	↑	1．5	↑	43
比較例６	↑	↑	↑	↑	115	50	100	4．0	4．8	0．83	11．3	↑	↑	64	44
実施例２	↑	ＬＬ[4]	↑	40／60	95	40	80	↑	5．1	0．78	13．3	↑	2．0	61	28
比較例７	↑	↑	↑	↑	↑	↑	↑	3．3	↑	0．64	13．9	↑	3．0	↑	25
実施例３	↑	ＰＥ[3]	並列型	50／50	110	100	100	3．4	3．9	0．87	6．5	↑	1．0	38	26
比較例８	↑	↑	↑	↑	↑	60	60	↑	3．8	0．89	15．1	↑	↑	↑	17

[1] ＭＳ比：実延伸比＋最高延伸比
[2] ＰＰ：結晶性ポリプロピレン
[3] ＰＥ：高密度ポリエチレン
[4] ＬＬ：直鎖状低密度ポリエチレン
[5] 機械：スタフィングボックスを用いて施した捲縮形態

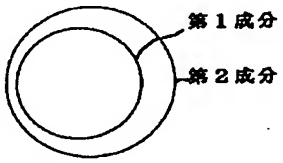
【００２１】　　＊　＊【表２】

	不織布物性等													
	含有量	目付	嵩特性			強力特性				地合特性				風合
	%	g／㎡	厚さ mm	回復率 %	合否	MD g/5cm	合否	CD g/5cm	合否	ﾄｯﾌﾟ数 個／㎡	合否	Web収縮 %	合否	
実施例１	100	25	2.0	61	○	2840	○	610	○	0	○	3.1	○	○
比較例１	比較例１の繊維物性のものは不織布加工不可													
比較例２	100	25	1.9	68	○	2520	○	590	○	13	×	4.7	○	△
比較例３	†	†	0.7	38	×	3150	○	780	○	0	○	2.9	○	×
比較例４	†	†	1.7	57	○	2720	○	510	○	38	×	6.3	○	△
比較例５	比較例５の繊維物性のものは不織布加工不可													
比較例６	†	†	1.6	60	○	2670	○	500	○	9	×	3.2	○	△
実施例２	†	30	2.2	53	○	3200	○	630	○	1	○	2.0	○	○
比較例７	†	†	1.4	32	×	2200	×	450	×	0	○	1.8	○	×
実施例３	†	20	1.3	55	○	2610	○	550	○	0	○	2.9	○	○
比較例８	†	†	1.0	62	○	2550	○	540	○	57	×	13.1	×	△
実施例４	50*)	25	1.3	51	○	2950	○	640	○	0	○	2.8	○	○
比較例９	30*)	†	1.0	45	×	3030	○	660	○	0	○	2.8	○	△

*)実施例１の繊維５０％と比較例３の繊維５０％を混綿　*)実施例１の繊維３０％と比較例３の繊維７０％を混綿

【図面の簡単な説明】　　※　※【図１】　本発明の複合繊維断面図

【図１】



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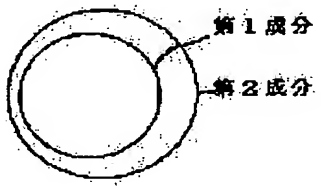
(71)Applicant : CHISSO CORP
(72)Inventor : ISHIZAWA HITOSHI
SUZUKI MASAYASU
TERADA HIROKAZU

(54) THERMALLY FUSIBLE CONJUGATE FIBER AND THERMALLY FUSIBLE NONWOVEN FABRIC

(57)Abstract:
PURPOSE: To obtain a surface material for sanitary materials such as sanitary napkin and paper diaper, excellent in strength of nonwoven fabric, high recovery of bulkiness and weave characteristics hardly forming nep (small fiber mass) and having soft touch feeling and a thermally fusible nonwoven fabric widely used as the surface material for sanitary materials.
CONSTITUTION: This thermally fusible conjugate fiber is composed of the first component comprising a crystalline polypropylene and the second component consisting mainly of polyethylene and the second component is arranged as parallel type or eccentric sheath-core type so as to continuously exist on at least one part of fiber surface in longitudinal direction and has threedimensional latent crimp having 4-16 tops/inch, 1.0-2.0 denier single yarn fineness and 20-40mm apparent cut length.



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CLAIMS

[Claim(s)]
[Claim 1] It consists of the 1st component which consists of crystalline polypropylene, and the 2nd component which consists mainly of polyethylene, it allots a parallel connected type or an eccentric sheath-core type so that the 2nd component may continue in the die-length direction in a part of fiber front face [at least] and it may exist, and it has the actual crimp of the three dimension of 4 - 16 crest / inch, and the single-yarn fineness 1.0-2.0d and appearance cut length are a 20-40mm thermal melting arrival nature bicomponent fiber.
[Claim 2] a parallel connected type or an eccentric sheath-core type -- the manufacture approach of the thermal-melting arrival nature bicomponent fiber of claim 1 which went via the annealing process which carries out annealing of the spinning process which carries out spinning with a mouthpiece, the extension process which extends the non-extended yarn by which spinning was carried out at 0.60 to 0.85 times of the highest draw ratio at 90 degrees-C or more temperature of 130 degrees C or less, and the extension yarn at 80 degrees-C or more temperature of 120 degrees C or less after the crimp processing process which cools and carries out crimp processing below at preheat temperature, and cooling.
[Claim 3] The thermal melting arrival nonwoven fabric with which the thermal melting arrival nature bicomponent fiber obtained by the manufacture approach of the thermal melting arrival nature bicomponent fiber of claim 1 term or claim 2 was contained 50% of the weight or more, and thermal melting arrival of the intersection of fiber was carried out by the thermal melting arrival of the 2nd component of this bicomponent fiber.
[Claim 4] The thermal melting arrival nonwoven fabric of claim 3 is used, and it is hygienic-goods facing with a thickness of 1mm or more.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the manufacture approach of a thermal melting arrival nature bicomponent fiber, and a thermal melting arrival nonwoven fabric. Furthermore, it excels in nonwoven fabric strength, high bulky recoverability, and a formation property with few neps (small fiber lump) in detail, and is related with the manufacture approach of the thermal melting arrival nonwoven fabric widely used as hygienic-goods facing, such as a sanitary napkin, a disposable diaper, etc. with a soft hand, and hygienic-goods facing, and a thermal melting arrival nature bicomponent fiber.
[0002]
[Description of the Prior Art] Nonwoven fabrics, such as hygienic-goods facing, such as a sanitary napkin and a disposable diaper, also develop the engine performance demanded with diversification, and maintain nonwoven fabric strength for the fewest possible eyes, and its bulky recovery factor is high, there are few neps (small fiber lump) as a formation property, and what has a soft hand is demanded in recent years. In order to fill these, the manufacture approach of the loft nonwoven fabric which carried out thermal melting arrival of the thermal melting arrival nature bicomponent fiber which specified the Q value of the 1st component, the preheating in specific temperature, draw magnification, the number of crimps, the crimp elastic modulus, etc. is learned by JP,1-37505,B.
[0003] However, it was still inadequate, as hygienic-goods facing, there was a trouble at a filamentation (card) process, many neps (small fiber lump) got worse formation, and the bulky recovery factor was small, and there was no strength and it was the bad nonwoven fabric of a hand. Moreover, development of the nonwoven fabric which solves these all is desired.
[0004]
[Means for Solving the Problem] this invention person reached invention shown below as a result of repeating research wholeheartedly that the above-mentioned fault should be improved. Namely, this invention consists of the 1st component which consists of crystalline polypropylene, and the 2nd component which consists mainly of polyethylene. It allots a parallel connected type or an eccentric sheath-core type so that the 2nd component may continue in the die-length direction in a part of fiber front face [at least] and it may exist. It has the actual crimp of the three dimension of 4 - 16 crest / inch. The single-yarn fineness 1.0-2.0d, appearance cut length -- a 20-40mm thermal melting arrival nature bicomponent fiber -- it is -- a parallel connected type or an eccentric sheath-core type -- the spinning process which carries out spinning with a mouthpiece -- The extension process which extends the non-extended yarn by which spinning was carried out at 0.60 to 0.85 times of the highest draw ratio at 90-degree-C or more temperature of 130 degrees C or less, It is the manufacture approach of the above-mentioned thermal melting arrival nature bicomponent fiber which went via the annealing process which carries out annealing of the extension yarn at 80-degree-C or more temperature of 120 degrees C or less after the crimp processing process which cools and carries out crimp processing below at preheat temperature, and cooling. It is the thermal melting arrival nonwoven fabric with which the thermal melting arrival nature bicomponent fiber obtained by an above-mentioned thermal

melting arrival nature bicomponent fiber or the above-mentioned manufacture approach was contained 50% of the weight or more, and thermal melting arrival of the intersection of fiber was carried out by the thermal melting arrival of the 2nd component of this bicomponent fiber, and is hygienic-goods facing with a thickness of 1mm or more using the above-mentioned thermal melting arrival nonwoven fabric.

[0005] The crystalline polypropylene used as the 1st component in the thermal melting arrival nature bicomponent fiber of this invention is the generic name of the crystalline polymer which uses a propylene as a principal component, and a copolymer not only with the homopolymer of a propylene but ethylene, butene-1, or 4-methyl pentene-1 grade etc. is contained in this. Moreover, although the polyethylene mainly used as the 2nd component is the generic name of the polymer which uses the ethylene like high pressure produced polyethylene or inside low pressure processed polyethylene as a principal component and a copolymer (EVA) not only with the homopolymer of ethylene but a propylene, butene-1, or vinyl acetate etc. is contained in this, as for the melting point of this polyethylene, it is desirable that it is lower than the melting point of the crystalline polypropylene which is the 1st component 20 degrees C or more. In the above-mentioned crystalline polypropylene and polyethylene, various kinds of stabilizers and bulking agent which are usually used for polyolefine fiber, a pigment, etc. can be added in the range which loss does not have in the purpose of this invention.

[0006] the thermal melting arrival nature bicomponent fiber of this invention -- a bicomponent fiber parallel connected type or an eccentric sheath-core type -- it is the bicomponent fiber by which spinning was carried out from the mouthpiece, and it is desirable for the 2nd component of a bicomponent fiber to continue and exist in the die-length direction in a part of fiber front face [at least], and to wear a fiber front face as widely as possible. Moreover, it is more desirable for the partial eccentric sheath-core type structure as a heart component shows to drawing 1 to have been desirable at the time of a sheath-core structure, and for a heart element center to incline 5 to 15% from the core of a compound component outer diameter, since this thermal melting arrival nature bicomponent fiber generates crimp using the difference of elastic contraction of two components. Such a bicomponent fiber can be obtained by the melt spinning method the sheath-core type which uses a parallel connected type or the 2nd component as a sheath component is conventionally well-known. Although there is no special limitation in the compound rate of both components, it is desirable that the 2nd component is 40 - 70 % of the weight.

[0007] The thermal melting arrival nature bicomponent fiber of this invention has desirable fiber which does not have substantially the so-called potential crimp from which it has three-dimension crimp and crimp does not produce it at the time of nonwoven fabric-ized heat treatment which carries out a postscript. The contraction accompanying the manifestation of the potential crimp which generates potential crimp at the time of nonwoven fabric-ized heat treatment as it is fiber which it does not have substantially is avoidable. the number of crimps of the thermal melting arrival nature bicomponent fiber of this invention -- 4 - 16 crest / inch -- they are 6 - 14 crest / inch preferably. When the numbers of crimps are under 4 crests / inch, since filamentation will worsen and generating of a nep etc. will take place in the case of nonwoven-fabric-izing if it becomes causes, such as coiling around the cylinder of a carding machine, and 16 crests / inch is exceeded, such a thing object is not made into an object.

[0008] The thermal melting arrival nature bicomponent fiber of this invention needs to be the single-yarn fineness 1.0-2.0d, and when it is less than 1.0d, and the number of crimps becomes fine, and there are problems, such as nep generating, and it exceeds 2.0d, since a hand becomes hard or the inclination for the recovery factor of a nonwoven fabric to be inferior is seen, such an object is not made into an object.

[0009] The appearance cut length of the thermal melting arrival nature bicomponent fiber of this invention is 25-35mm preferably 20-40mm. At the time of less than 20mm, the translatability of the fiber within a carding machine is bad, and it will become the cause of troubles, such as coiling around a walker, and if 40mm is exceeded, a debt of fiber will become strong and will become causes, such as nep generating. Moreover, 50 - 70% of thing has [the thermal melting arrival nature bicomponent fiber of this invention] the desirable ratio of appearance cut length /

cut length. At the time of less than 50%, the translatability of the fiber within a carding machine is bad, coils around a cylinder etc., and causes troubles, such as nep generating, if 70% is exceeded, a debt of fiber will become strong, and it becomes causes in a taker-in roller, such as coiling round, and the card process itself serves as impossible.

[0010] the manufacture approach of the thermal-melting arrival nature bicomponent fiber of this invention -- a parallel connected type or an eccentric sheath-core type -- it goes via the crimp processing process which cools and carries out crimp processing of the spinning process which carries out spinning with a mouthpiece, the extension process which extends the non-extended yarn by which spinning was carried out at 0.60 to 0.85 times of the highest draw ratio at 90 degrees-C or more temperature of 130 degrees C or less, and the extension yarn below at preheat temperature, and the annealing process which carries out annealing after cooling at 80 degrees-C or more temperature of 120 degrees C or less.

[0011] a spinning process carries out spinning of the 1st component which consists of crystalline polypropylene, and the 2nd component which consists mainly of polyethylene, and the 2nd component continues and exists in the die-length direction in a part of fiber front face [at least] -- as -- a parallel connected type or an eccentric sheath-core type -- spinning is carried out with a mouthpiece. At an extension temperature process, the non-extended yarn by which spinning was carried out is beforehand heated to extension temperature. When the number of crimps becomes fine when extension temperature is less than 90 degrees C, and exceeding 130 degrees C, since the welding of the fiber by polyethylene occurs remarkably, it is not desirable. If the difference of elastic contraction of two components for generating crimp decreases, and crimp does not occur and it becomes 0.85 or more times when a draw ratio is 0.60 or less times of the highest draw ratio, the difference of elastic contraction is large, and since the period of crimp becomes small, it sees [that the number of crimps increases, or] and cut length becomes small, it is not desirable. Here, the highest draw ratio means a draw ratio in case a draw ratio is raised gradually and a fluff begins to occur in a tow when in the ** case.

[0012] A crimp processing process cools extension yarn below to extension temperature, and makes crimp discover by the taking over roll of a nip roll etc. taking over extension yarn by turgescence, and making it a relaxed state. Under the present circumstances, in the case of the temperature exceeding extension temperature, crimp becomes inadequate. In an annealing process, annealing of the thermal melting arrival nature bicomponent fiber which crimp discovered is carried out for about 0.5 - 30 minutes after crimp processing at 80-degree-C or more temperature of 120 degrees C or less. Since the crimp generated with the difference of elastic contraction above 120 degrees C becomes large, it has [annealing temperature / neither] elongation appearance cut length desirable since there is a possibility that potential crimp may occur at less than 80 degrees C at the time of nonwoven fabric processing. The thermal melting arrival nature bicomponent fiber of this invention is cut from the ease of carrying out of processing to a nonwoven fabric etc. to predetermined die length, and is used as a staple in many cases.

[0013] The thermal melting arrival nonwoven fabric of this invention may contain the above-mentioned thermal melting arrival nature bicomponent fiber 50% of the weight or more, and may be 100 % of the weight. A thermal melting arrival nonwoven fabric is obtained as a nonwoven fabric by considering as a web by the conventional carding method, the air-Rey method, and the dry type pulp method, and heating and carrying out thermal melting arrival of this web. As for the thermal melting arrival nonwoven fabric of this invention, fiber, such as natural fibers, such as the synthetic fiber or cotton of polyester, a polyamide, polypropylene, polyethylene, and others, and wool, and rayon, may be mixed less than 50% of the weight as fiber other than the above-mentioned thermal melting arrival nature bicomponent fiber. Under the present circumstances, this thermal melting arrival nature bicomponent fiber needs to be mixed 50% of the weight or more. When this thermal melting arrival nature bicomponent fiber is less than 50%, since there are few heat welding points in the intersection of fiber and the loft of about [that high nonwoven fabric strength is not acquired] and the purpose and recoverability are not acquired, such an object is not made into an object.

[0014] As an approach of heating and carrying out thermal melting arrival, approaches, such as

hot blast dryer and suction band dryer -, are mentioned, thermal melting arrival of the intersection of fiber is carried out by the thermal melting arrival of the 2nd component of a bicomponent fiber by this, and it becomes a nonwoven fabric. More than the melting point of the 2nd component of a bicomponent fiber, this heat treatment temperature is the temperature below the melting point of the 1st component, and is about 120 to 155 degree C. The processing time is about 5 seconds or more, when using a dryer etc. The hygienic-goods facing of this invention is hygienic-goods facing with a thickness of 1mm or more using the above-mentioned thermal melting arrival nonwoven fabric. a bulky property is especially 1mm or more, and a recovery factor is 50% or more -- it is desirable. In case thickness is less than 1mm and a recovery factor is less than 50%, since soft aesthetic property is not obtained, such an object is not made into an object. With the thickness said here, the load of 50gf(s) is applied per two 1cm for 24 hours. It is no-load after that for 1 hour, and recover neglect and thickness and the thickness (mm) which applied to which and measured the load of 2gf(s) per two 1cm is put. A recovery factor is no-load for 1 hour the thickness to which the load of 50kgf(s) was applied for 24 hours and which measured it per two 1cm, and after that, and is the object in which the difference of the thickness which was made to recover neglect and thickness and was measured was shown by the percentage (%).

[0015]

[Example] Hereafter, an example is given and this invention is explained concretely. In addition, the measuring method of the physical-properties value shown in the example or the definition is shown collectively.

The number of crimps: JIS It measured according to L1015 (chemical fiber staple test method) 7.12.1.

Single-yarn fineness: JIS It measured according to A law of L1015 (chemical fiber staple test method) 7.5.1.

[0016] Appearance cut length: The staple which gave crimp was lengthened and the fiber length (mm) in atony-izing was asked for the average of measurement and 30 measured value, without applying the excessive force.

****** : Apply the load of 50gf(s) to the obtained nonwoven fabric per two 1cm for 24 hours, and thickness (A) measurement is carried out. It was no-load after that for 1 hour, and neglect and thickness were recovered, the load of 2gf(s) was applied per two 1cm, thickness (B) was measured, and it asked by the percentage (%) of a recovery factor (thickness (B)-thickness (A))/thickness (B), and the yes-no decision made 50% or more **, made except [its] no, and O showed ** and it showed no by x.

nonwoven fabric powerful: -- JIS L1085 (nonwoven fabric padding cloth test method) -- applying correspondingly -- a test piece with a width of 5cm -- grip spacing of 10cm, and the speed of testing of 30**2cm -- a grain direction (MD) and its direction of a right angle (CD) -- measuring -- a yes-no decision -- MD -- powerful -- 2500g / 5cm or more -- ** and the following -- no and CD -- powerful -- 500g / 5cm or more be made into **, the following be made into no, O showed ** and x showed no.

The number of neps: The number of the neps in 1m 2 of nonwoven fabrics was counted, an individual / m2 showed, one or less was made into **, two or more were made into no, O showed ** and x showed no.

hand: -- being improper in the case where the case where it judges that the case where performed the organoleptics by five persons' panelist and it judges with all the members being soft is [A and more than trinominal] soft is judged as good and more than trinominal lacking in a feeling of software -- evaluating -- A -- O and good -- ** and a failure -- x -- it was come out and shown.

Web contraction: After cutting the web for 25cm around and heating for 5 minutes at 145 degrees C under a no-load using a dryer, it asked for three contraction of a grain direction, and the average was shown, less than 10% was made into **, 10% or more was made into no, O showed ** and x showed no.

[0017] the polyethylene which uses one to examples 1-4 and example of comparison 9 polypropylene as the 1st component, and is shown in the 1st table -- the 2nd component --

carrying out — 0.6mm of apertures, and a hole — the sheath-core mold of a-350 number, and a parallel connected type — extension and the staple shown in the 1st table using the cutter of predetermined die length were obtained on the conditions which show a bicomponent fiber in spinning and the 1st table using a mouthpiece. These fiber physical properties were collectively shown in the 1st table.

[0018] It is the obtained thermal melting arrival nature bicomponent fiber staple by the carding machine A superintendent officer 20 - 30 g/m2 The nonwoven fabric in which used as the web, and heat-treated this web for 5 seconds at the predetermined temperature of 135-140 degrees C using the suction band dryer, and the intersection of thermal melting arrival nature fiber carried out thermal melting arrival was obtained. The nonwoven fabric property etc. was shown in the 2nd table. The staple of the example 1 of the 1st table and the example 3 of a comparison was used for the example 4 and the example 8 of a comparison among the 2nd table.

[0019]

[Effect of the Invention] The thermal melting arrival nature bicomponent fiber of this invention had the high bulky recoverability which was impossible until now, the formation property was good, there was high strength, a feeling of a touch is fiber useful as a very soft nonwoven fabric and hygienic-goods facing, and what is satisfied with coincidence of all amelioration of these was obtained. Thereby, it can use for nonwoven fabrics, such as a sanitary napkin and a disposable diaper, hygienic-goods facing, etc. widely.

[0020]

[Table 1]

	繊維物性等														
	第1成分	第2成分	複合構造	複合比率 第1成分／第2成分	延伸温度 ℃	冷却温度 ℃	アニール温度 ℃	実延伸比	最高延伸比	MS比[1]	捲縮数 山／吋	繊維形態	単糸繊度 d	カット長 mm	見かけカット長 mm
実施例1	PP[2]	PE[3]	鞘芯型	50／50	115	50	100	4.0	4.8	0.83	11.3	3次元	1.5	51	34
比較例1	↑	↑	↑	↑	↑	↑	130	↑	↑	↑	3.5	↑	↑	↑	43
比較例2	↑	↑	↑	↑	↑	↑	100	4.4	↑	0.92	18.2	↑	↑	↑	21
比較例3	↑	↑	↑	↑	↑	↑	↑	4.0	↑	0.83	12.7	機械[5]	↑	↑	29
比較例4	↑	↑	↑	↑	110	80	80	3.2	3.5	0.91	16.0	3次元	0.8	↑	22
比較例5	↑	↑	↑	↑	↑	↑	↑	2.0	↑	0.57	3.1	↑	1.5	↑	43
比較例6	↑	↑	↑	↑	115	50	100	4.0	4.8	0.83	11.3	↑	↑	64	44
実施例2	↑	LL[4]	↑	40／60	95	40	80	↑	5.1	0.78	13.3	↑	2.0	51	28
比較例7	↑	↑	↑	↑	↑	↑	↑	3.3	↑	0.64	13.9	↑	3.0	↑	25
実施例3	↑	PE[3]	並列型	50／50	110	100	100	3.4	3.9	0.87	6.5	↑	1.0	38	26
比較例8	↑	↑	↑	↑	↑	60	60	↑	3.8	0.89	15.1	↑	↑	↑	17

[1] MS比：実延伸比+最高延伸比
[2] PP：結晶性ポリプロピレン
[3] PE：高密度ポリエチレン
[4] LL：直鎖状低密度ポリエチレン
[5] 機械：スタフィングボックスを用いて施した捲縮形態

[0021]

[Table 2]

	不織布物性等													
	含有量	目付	嵩特性			強力特性				地合特性				風合
	%	g／㎡	厚さ mm	回復率 %	合否	MD g/5cm	合否	CD g/5cm	合否	ﾈｯﾌﾟ数 個／㎡	合否	Web収縮 %	合否	
実施例1	100	25	2.0	61	○	2840	○	610	○	0	○	3.1	○	○
比較例1	比較例1の繊維物性のものは不織布加工不可													
比較例2	100	25	1.9	68	○	2520	○	590	○	13	×	4.7	○	△
比較例3	↑	↑	0.7	38	×	3150	○	780	○	0	○	2.9	○	×
比較例4	↑	↑	1.7	57	○	2720	○	510	○	38	×	6.3	○	△
比較例5	比較例5の繊維物性のものは不織布加工不可													
比較例6	↑	↑	1.6	60	○	2670	○	500	○	9	×	3.2	○	△
実施例2	↑	30	2.2	53	○	3200	○	630	○	1	○	2.0	○	○
比較例7	↑	↑	1.4	32	×	2200	×	450	×	0	○	1.8	○	×
実施例3	↑	20	1.3	55	○	2610	○	550	○	0	○	2.9	○	○
比較例8	↑	↑	1.0	62	○	2550	○	540	○	57	×	13.1	×	△
実施例4	50*1)	25	1.3	51	○	2950	○	640	○	0	○	2.8	○	○
比較例9	30*2)	↑	1.0	45	×	3030	○	660	○	0	○	2.8	○	△

*1)実施例1の繊維50%と比較例3の繊維50%を混綿　*2)実施例1の繊維30%と比較例3の繊維70%を混綿

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The bicomponent fiber sectional view of this invention

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[Translation done.]

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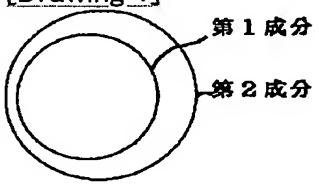
DRAWINGS

[Drawing 1]



[Translation done.]